

# UNCLASSIFIED

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 5

PROGRAM ELEMENT: 0604710N

PROGRAM ELEMENT TITLE: Navy Energy Program (ENG)

A. (U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0371	2,830	3,530	5,446	5,586	5,853	5,951	6,125	6,268	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Develop energy-efficient systems and practices for ships, facilities, and aircraft. Resulting energy efficiency gains contribute to fleet sustainability, combat capability (e.g., greater range, time on station), and reduced operating costs. Efforts include fuel use optimization aids for aircraft; existing gas turbine engine efficiency improvements, anti-fouling paints, air conditioning and lighting for ships; and adaptation of renewable/alternative energy technologies to Navy facility needs. Provide engineering development, and test and evaluation support to the companion PE 0603724N Project R0829. Annual savings of \$130M were achieved in FY 1995 and, as currently funded, \$155M is projected for FY 2000 compared to FY 1985 cost.

(U) This program, and the companion PE 0603724N Navy Energy Program (ADV), support the achievement of Legislated, White House, DoD, and Navy Energy Management Goals; and also address the Office of the Secretary of Defense, the Secretary of the Navy, and the Chief of Naval Operations direction to make up-front investment in technologies that reduce future cost of operation and ownership of the fleet and supporting infrastructure. Navy is TRISERVICE lead for the implementation of renewable/alternative energy systems across DoD.

(U) Joint Mission Areas (JMA)/Warfare Areas: This program directly supports the following JMA's: Strike, Littoral Warfare, Sea and Air Superiority, Strategic Mobility, Readiness, and Support and Infrastructure.

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Budget Item Justification  
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PROGRAM ELEMENT: 0604710N

PROJECT NUMBER: R0371

PROGRAM ELEMENT TITLE: Navy Energy Program (ENG)

PROJECT TITLE: Energy Conservation (ENG)

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ENGINEERING & MANUFACTURING DEVELOPMENT because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$537) Aircraft: Developed fleet requested enhancements of Flight Optimization Routines for Energy Management (FOREM) software and began conversion to WINDOWS format. Provided FOREM cruise and loiter algorithms for P-3C to contractor developing P-3 Flight Performance Advisory System (FPAS) which will be installed on the aircraft and capable of manual input operations by Dec 1998 (takeoff, climb, descent and landing algorithms also delivered). Provided palmtop portable computers running FOREM to Marine Corps squadrons for in-the-field flight planning. Initiated joint effort to provide certified FOREM flight performance data to the tactical aircraft mission planning system (TAMPS) program for use in their stand alone flight planner. They will pay for translation of existing FOREM databases and we will cost share database development for additional aircraft of mutual interest.
- (U) (\$886) Ships: Installed stern flap on USS A.W.Radford (DD968) test ship for powering trials: fuel consumption savings were more than twice that predicted from model tests; acoustic tests showed no adverse impact. Supported endurance test of modified air conditioning plant (R114 replacement program), monitoring efficiency. Continued advanced easy release and ablative copper/cobiocide anti-fouling coating ship trials; belly stripe and hull patch performance demonstrations; and life cycle management studies.
- (U) (\$1,407) Facilities: Tested and evaluated advanced solar photovoltaic (PV) systems incorporating thin film receptors and ganged, parallel, processors/controllers. Continued test and evaluation of solar/wind and solar/fuel cell hybrid power systems. Continued development of a high efficiency low emissions power generation concept. Provided systems engineering support for renewable energy sources to all services, in response to DoD wide technical lead assignment.

2. (U) FY 1999 PLAN:

- (U) (\$720) Aircraft: WINDOWS version of FOREM will be developed, tested and distributed to fleet for F/A-18A/B/C/D, F-14A/B/D, EA-6B, TA-4J, T-45, AV-8B and P-3C platforms. Monitor P-3 contracted development of airframe to computer interfaces required to automate P-3 FPAS sensor inputs (e.g. fuel flow, external winds and

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temperature, MACH NO. and altitude). Provide palmtop portable computers running FOREM to additional Marine squadrons. Provide TAMPS with FOREM databases for F-14, and additional aircraft TBD. Begin FOREM flight performance database development for additional aircraft of interest mainly to TAMPS (e.g. S-3B, E-2C, CH-53E).

- (U) (\$1,120) Ships: Conduct pre-installation powering trials for TAO-187 hydrodynamic mods and DDG-51 retrofit stern flap or wedge/flap combination. Support test and evaluation (T&E) of new 125 ton air-conditioning plant with optimized impeller/compressor designed to avoid efficiency losses in R114 replacement program. T&E life cycle management procedures for advanced hull coatings. Conduct panel tests of self-polishing copper/cobiocide paint. Continue to monitor large-scale test applications of other easy release and advanced copper hull paints.
- (U) (\$1,657) Facilities: Investigate PV/Fuel Cell hybrid power system technology/concepts. Accelerate the development of high efficiency, low emissions, power generation concept. Support and T&E of PV/Diesel hybrid power systems for off-grid applications. Continue systems engineering support for renewable energy power systems as DoD assigned technical lead.
- (U) (\$33) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

## 3. (U) FY 2000 PLAN:

- (U) (\$990) Aircraft: Complete conversion of FOREM software to WINDOWS format and deliver to C-9, C-130, and C-2. Extend FOREM to additional aircraft such as MV-22, E-6A, F/A-18E/F. Provide TAMPS program with FOREM data, to eliminate duplication of effort, for requested aircraft classes. Cost share contracted effort to automate P-3 FPAS; assist in performance validation of F/A-18E/F FPAS.
- (U) (\$1,992) Ships: Install and conduct powering trials for DDG-51 stern flap or wedge/flap retrofit devices to reduce drag. Monitor ship trials of easy release and ablative copper/cobiocide hull coatings; broaden task to include large-scale tests of reduced copper/cobiocide self-polishing paints. Test and evaluate high efficiency air conditioning plants, supporting both R114 replacement program and development efforts for new construction. Develop shipboard Gas Turbine engine mods which reduce air leakage, improve water wash procedures and reduce exhaust back-pressure to improve efficiency and reduce maintenance costs.
- (U) (\$2,464) Facilities: Continue design and T&E of PV/Diesel hybrid power systems for off grid applications. Continue development of high efficiency, low emissions, power generation system. T&E advanced PV module

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technologies for grid support and energy efficient/sustainable building designs. Initiate T&E of advanced energy storage concepts for PV systems. Provide all Services with system design and T&E support to implement zero emission, renewable/alternative power systems to address green house gas emission (GHG) reduction. Provide technical support for site-specific technology selection for renewable/alternative power systems as assigned DoD technical lead.

## B. (U) PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	2,873	5,544	2,592
(U) Appropriated Value:	0	3,544	-
(U) Adjustments from FY 1999 PRESBUDG:	-43	-2,014	2,854
(U) FY 2000 President's Submission:	2,830	3,530	5,446

## (U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 decrease reflects Small Business Innovative Research adjustment (-34) and actual execution (-9). The FY99 decrease reflects a Congressional Reduction in appropriation (-2,000), and an adjustment for undistributed reductions (-14). The FY 2000 increase results from an NWCF adjustment of (+2,938), CIVPERS (+18), Non Pay Inflation (-79) and Working Capital (-23).

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PROJECT TITLE: Energy Conservation (ENG)

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0601153N (Defense Research Sciences)

(U) PE 0602121N (Ship, Submarine & Logistics Technology)

(U) PE 0602122N (Aircraft Technology)

(U) PE 0602234N (Materials, Electronics and Computer Technology)

(U) PE 0603508N (Surface Ship & Submarine HM&E Advanced Technology)

(U) PE 0603712N (Environmental Quality and Logistics Advanced Technology)

(U) PE 0603721N (Environmental Protection)

(U) PE 0603724N (Navy Energy Program (ADV)

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D. (U) SCHEDULE PROFILE: Not applicable.

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FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

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PROGRAM ELEMENT TITLE: Navy Energy Program (ENG)

PROJECT TITLE: Energy Conservation (ENG)

A. (U) PROJECT COST BREAKDOWN: (\$ in thousands)

Project Cost Categories	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Engineering Development & Testing	2,830	3,530	5,446

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RDT&E PE/Project Cost Breakdown  
(Exhibit R-3, page 6 of 8)

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FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

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PROGRAM ELEMENT TITLE: Navy Energy Program (ENG)

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## B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION (\$ in thousands)

### PERFORMING ORGANIZATIONS

<u>Contractor/ Government Performing Activity</u>	<u>Contract Method/ Fund Type Vehicle</u>	<u>Award/Perform Oblig Date</u>	<u>Activity EAC</u>	<u>Project Office EAC</u>	<u>Total FY 1997 &amp; Prior</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Budget</u>	<u>To Complete</u>	<u>Total Program</u>
Product Development										
NSWCCDD, ANNAPOLIS					42,558	881	1,170	1,908	cont.	cont.
NAWCAD, PATUXENT					32,746	537	720	990	cont.	cont.
NAWCWD, CHINA LAKE					2,239	575	640	858	cont.	cont.
MISCELLANEOUS					31,587	837	1,000	1,690	cont.	cont.

Support and Management: Not Applicable

Test and Evaluation: Not Applicable

GOVERNMENT FURNISHED PROPERTY: Not Applicable

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RDT&E PE/Project Cost Breakdown  
(Exhibit R-3, page 7 of 8)

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	<u>Total FY 1997 &amp; Prior</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Budget</u>	<u>FY 2001 Budget</u>	<u>To Complete</u>	<u>Total Program</u>
Subtotal Product Development.	109,130	2,830	3,530	5,446	5,586	cont.	cont.
Subtotal Support and Management	0	0	0	0	0		
Subtotal Test and Evaluation	0	0	0	0	0		
Total Project	109,130	2,830	3,530	5,446	5,586	cont.	cont.

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RDT&E PE/Project Cost Breakdown  
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